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(54) **WINDOW OPENING CONTROL DEVICE FOR HORIZONTAL AND VERTICAL SLIDING WINDOWS**

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E05B 65/08 (2006.01)
E06B 3/44 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***E05B 65/0835*** (2013.01); ***E05B 65/0014*** (2013.01); ***E05C 17/50*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC E05B 65/0835; E05B 65/0841; E06B 3/4415; E05C 17/60
USPC ..... 49/449, 176, 181, 183–185; 292/338, 292/339, DIG. 20, DIG. 47, 230
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

37,625 A 2/1863 Hyde
198,553 A 12/1877 Auer
(Continued)

FOREIGN PATENT DOCUMENTS

FR 2572145 A1 4/1986
GB 2410058 A 7/2005
(Continued)

OTHER PUBLICATIONS

"U.S. Appl. No. 13/006,873, Non Final Office Action mailed Nov. 9, 2012", 6 pgs.
"U.S. Appl. No. 13/006,873, Notice of Allowance mailed Apr. 24, 2013", 6 pgs.
(Continued)

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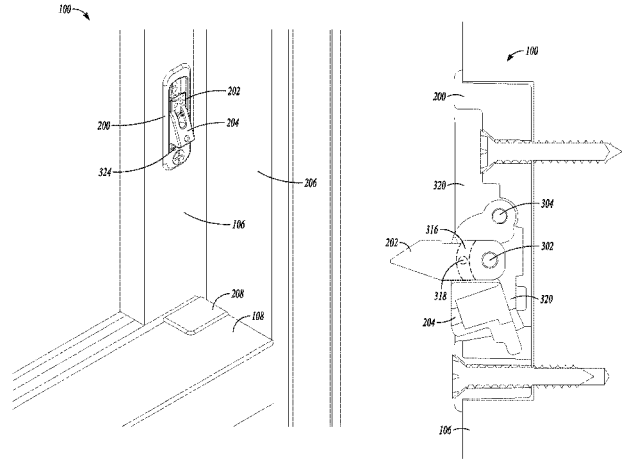
(57) **ABSTRACT**

A sash limiter assembly includes a limiter housing configured for installation in a sash or a window frame of a window. A sash stop is movably coupled with the limiter housing, and the sash stop is movable between engaging and retained positions. A reset is movably coupled with the limiter housing, and the reset is movable into a resetting position. The sash limiter assembly is configured for positioning between a sash limiting configuration and a resetting configuration. In the sash limiting configuration the sash stop is in the engaging position and positioned in a translation path of the sash. In the resetting configuration the sash stop is held in the retained position by the reset in the resetting position. In the retained position the sash stop is out of alignment with the translation path, and in the resetting position the reset is positioned within the translation path.

27 Claims, 15 Drawing Sheets



(51) **Int. Cl.**

E05C 17/60	(2006.01)
E05B 65/00	(2006.01)
E05C 17/50	(2006.01)
E06B 5/11	(2006.01)
E05C 7/00	(2006.01)

(52) **U.S. Cl.**

CPC ***E05C 17/60*** (2013.01); ***E06B 3/4415*** (2013.01); *E05C 2007/007* (2013.01); *E06B 3/4407* (2013.01); *E06B 5/113* (2013.01)

(56) **References Cited**

U.S. PATENT DOCUMENTS

226,033	A *	3/1880	Burns, Jr.	E05B 63/20	292/336
278,802	A	6/1883	Kubler et al.		
523,736	A	7/1894	Cazin		
551,181	A	12/1895	Dillon		
756,453	A	4/1904	Arens et al.		
804,994	A *	11/1905	Andrews	E05B 65/0852	292/210
976,777	A	11/1910	Brown		
1,016,422	A	2/1912	Lauritsen		
1,069,079	A	7/1913	Voight		
1,261,274	A	4/1918	Newsam		
1,322,677	A *	11/1919	Ditlefsen	E05B 65/0852	292/210
1,350,698	A	8/1920	Boedtcher		
1,724,637	A	8/1929	Bergstrom		
1,946,833	A *	2/1934	Brown	E05F 11/00	292/219
2,062,020	A	11/1936	Engel		
2,158,260	A *	5/1939	Stillman	E05F 11/00	292/336
3,083,045	A	3/1963	Linderoth		
3,151,901	A	10/1964	Aldgren		
3,897,966	A	8/1975	Draughon		
3,910,614	A	10/1975	Coe		
3,912,311	A	10/1975	Carvell et al.		
4,027,907	A	6/1977	Crepinek		
4,095,827	A	6/1978	Stavenau		
4,248,461	A	2/1981	Stevens		
4,263,747	A	4/1981	Coltrin et al.		
4,379,576	A	4/1983	Blough et al.		
4,383,666	A	5/1983	Allerding et al.		
4,577,896	A	3/1986	Crepinsek		
4,580,819	A	4/1986	Crepinsek		
4,580,820	A	4/1986	Baber		
4,635,976	A	1/1987	Sigler		
4,639,024	A	1/1987	Crepinsek		
4,897,961	A	2/1990	Shine		
5,248,174	A *	9/1993	Matz	E05B 65/0852	292/338
5,452,596	A	9/1995	Yamada		
5,457,971	A	10/1995	Yamada		
5,536,052	A	7/1996	Maier		
5,575,116	A	11/1996	Carlson et al.		
5,647,233	A	7/1997	Chung		
5,669,256	A	9/1997	Chung		
5,806,900	A	9/1998	Bratcher et al.		
6,000,735	A	12/1999	Jourdenais		
6,021,603	A	2/2000	Prete et al.		
6,364,375	B1	4/2002	Szapucki et al.		
6,382,689	B1	5/2002	Brown		
6,572,158	B2 *	6/2003	Szapucki	E05B 65/0852	292/221
6,634,681	B1	10/2003	Redden		
6,684,454	B2	2/2004	Ehrenreich		
7,063,361	B1	6/2006	Lawrence		
7,093,392	B2	8/2006	Derham et al.		
7,296,831	B2	11/2007	Generowicz et al.		
7,441,812	B2	10/2008	Welsh et al.		
D581,247	S	11/2008	Durrant		
7,494,164	B1 *	2/2009	Garries	E05B 65/0835	292/332
7,588,271	B1	9/2009	Lawrence		
7,600,796	B2	10/2009	Liang et al.		
8,075,038	B2	12/2011	Zielinsky		
8,096,593	B2	1/2012	Gibbons		
8,360,484	B2 *	1/2013	Liang	E05B 65/0847	292/220
8,490,330	B2	7/2013	Lund et al.		
8,776,440	B2 *	7/2014	Sopkowiak	E05B 65/0835	292/338
8,888,146	B2	11/2014	Taylor et al.		
8,991,228	B2	3/2015	Yang		
2003/0122387	A1	7/2003	Ward		
2003/0167694	A1	9/2003	Liang		
2007/0182168	A1	8/2007	Allen		
2007/0222233	A1	9/2007	Liang et al.		
2010/0019513	A1	1/2010	Generowicz et al.		
2010/0072763	A1	3/2010	Allen		
2011/0113695	A1 *	5/2011	Derham	E05C 3/12	49/445
2011/0173895	A1	7/2011	Lund et al.		
2011/0203184	A1	8/2011	Nguyen et al.		
2012/0144752	A1 *	6/2012	Piltingsrud	E05C 17/46	49/450
2012/0167475	A1	7/2012	Sopkowiak et al.		
2015/0159429	A1	6/2015	Lund		

FOREIGN PATENT DOCUMENTS

GB	2461079	A	12/2009
GB	2461107	A	12/2009
GB	2461108	A	12/2009
WO	WO-99/46464	A2	9/1999
WO	WO-2009/072839	A1	6/2009
WO	WO-2009/153562	A1	12/2009
WO	WO-2009/153564	A1	12/2009

OTHER PUBLICATIONS

"U.S. Appl. No. 13/006,873, Response filed Feb. 8, 2013 to Non Final Office Action mailed Nov. 9, 2012", 11 pgs.

"U.S. Appl. No. 13/006,873, Response filed Oct. 5, 2012 to Restriction Requirement mailed Sep. 20, 2012", 9 pgs.

"U.S. Appl. No. 13/006,873, Restriction Requirement mailed Sep. 20, 2012", 5 pgs.

"U.S. Appl. No. 13/328,776 , Response filed Feb. 13, 2014 to Final Office Action mailed Nov. 22, 2013", 15 pgs.

"U.S. Appl. No. 13/328,776, Examiner Interview Summary mailed Jan. 30, 2014", 3 pgs.

"U.S. Appl. No. 13/328,776, Final Office Action mailed Nov. 22, 2013", 14 pgs.

"U.S. Appl. No. 13/328,776, Non Final Office Action mailed Jun. 21, 2013", 12 pgs.

"U.S. Appl. No. 13/328,776, Notice of Allowance mailed Mar. 7, 2014", 11 pgs.

"U.S. Appl. No. 13/328,776, Response filed Apr. 10, 2013 to Restriction Requirement mailed Feb. 14, 2013", 11 pgs.

"U.S. Appl. No. 13/328,776, Response filed Sep. 20, 2013 to Non Final Office Action mailed Jun. 21, 2013", 19 pgs.

"U.S. Appl. No. 13/328,776, Restriction Requirement mailed Feb. 14, 2013", 5 pgs.

"Dual Action, Deep Bend", Mighton Products LTD, (Oct. 1, 2010), 1 pg.

"Reverse Retrofit Right Hand"; Angel Ventlock™ Products | Reverse Retrofit—Duel Action | Mighton Products—http://www.angel-ventlock.com/angel-ventiock-products/dual-action/reverse-retrofit, 3 pgs.

Sopkowiak, J., et al., "Sash Limited Apparatus and Method", U.S. Appl. No. 13/328,776, filed Dec. 16, 2011, 67 pgs.

Sopkowiak. J., et al., "Sash Limiter Apparatus and Method", U.S. Appl. No. 61/486,813, filed May 17, 2011, 63 pgs.

"Canadian Application Serial No. 2,886,226, Office Action mailed Feb. 16, 2016", 5 pgs.

"U.S. Appl. No. 14/565,144, Non Final Office Action mailed Jan. 14, 2016", 14 pgs.

(56) **References Cited**

OTHER PUBLICATIONS

"U.S. Appl. No. 14/565,144, Restriction Requirement mailed Sep. 10, 2015", 6 pgs.

U.S. Appl. No. 14/565,144, Final Office Action mailed Jun. 17, 2016, 7 pgs.

U.S. Appl. No. 14/565,144, Response filed Apr. 14, 2016 to Non Final Office Action mailed Jan. 14, 2016, 20 pgs.

* cited by examiner

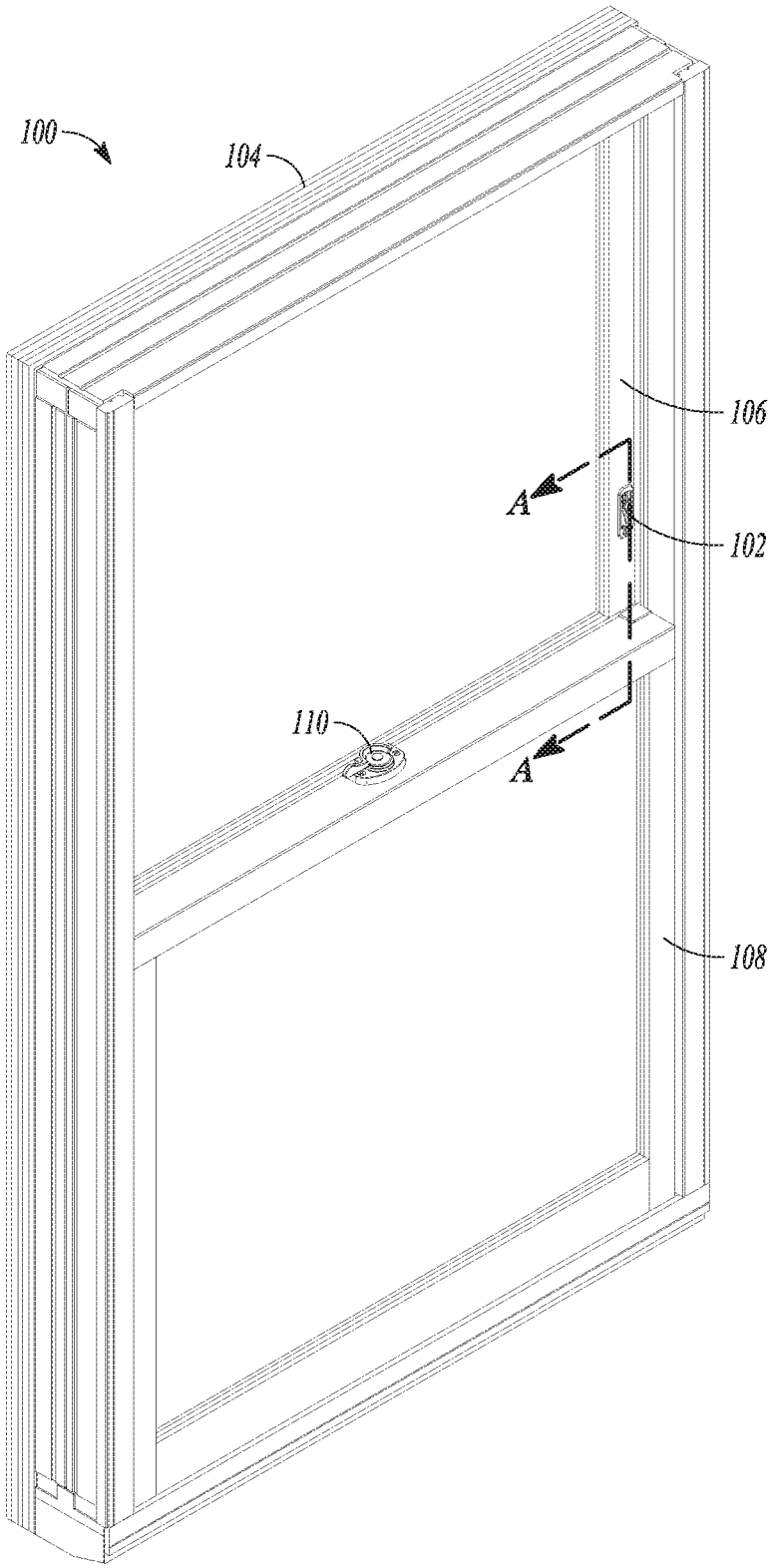
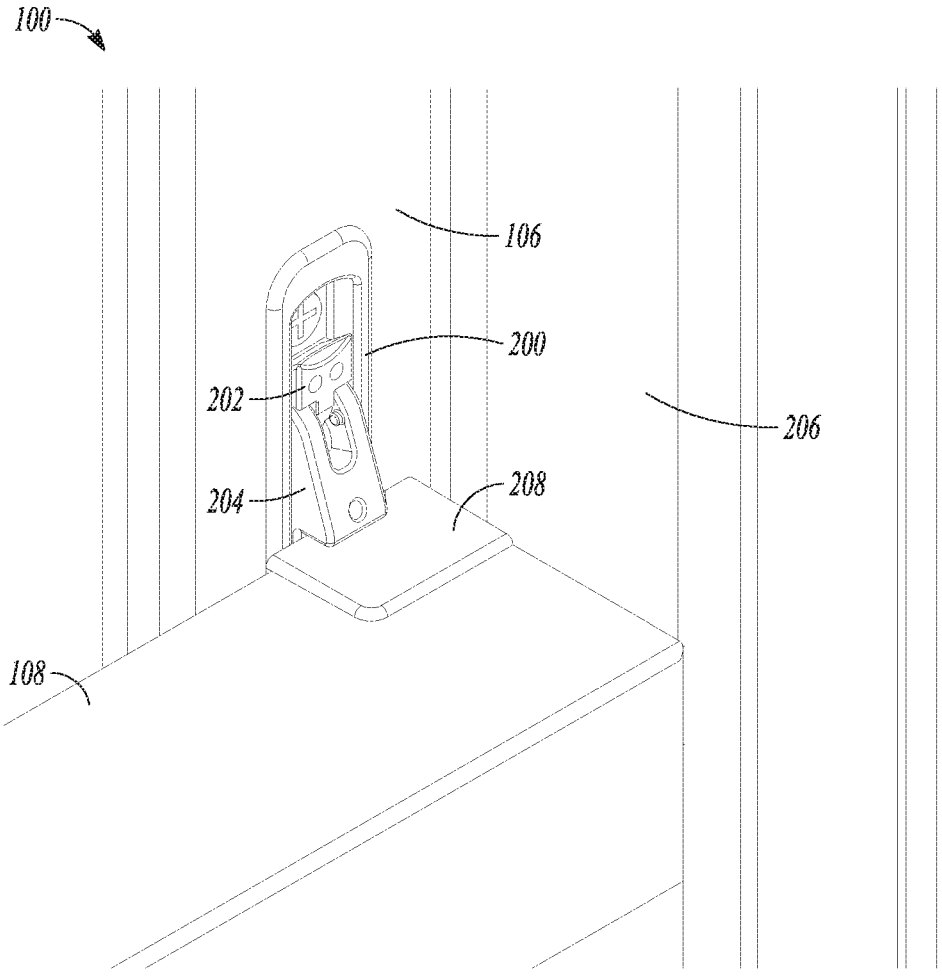


FIG. 1



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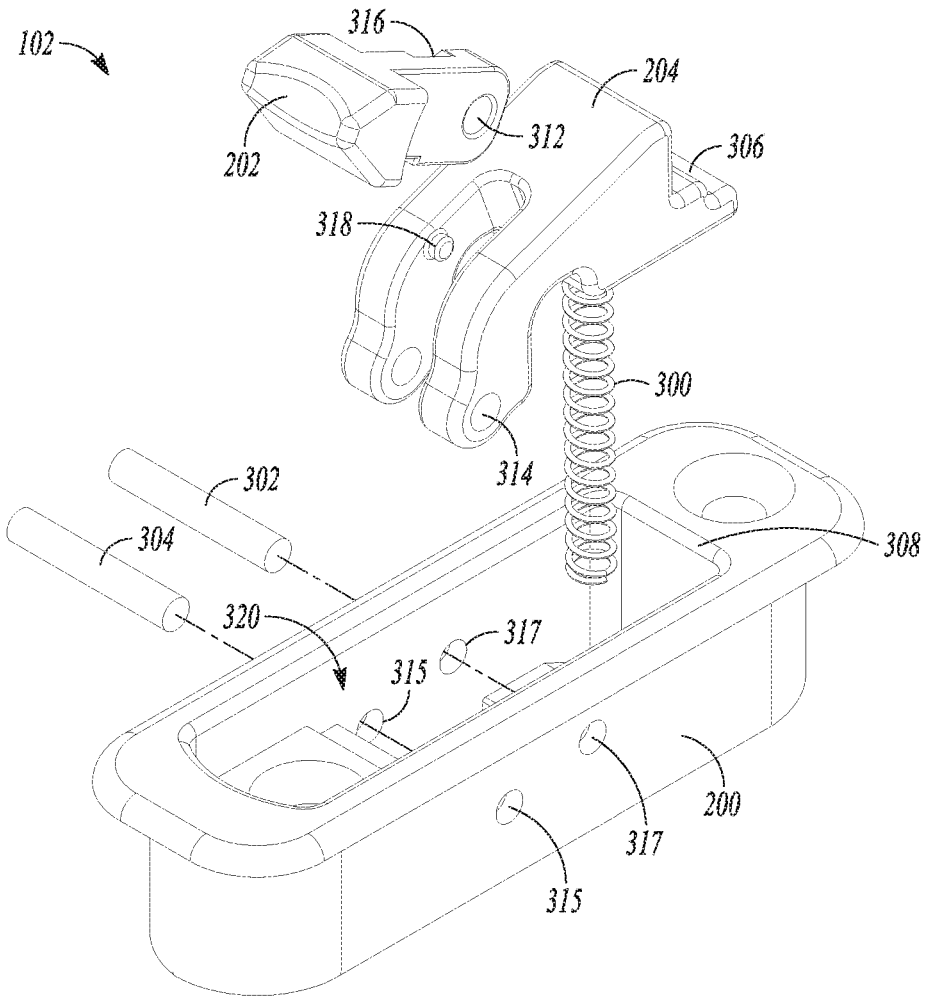
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202
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200
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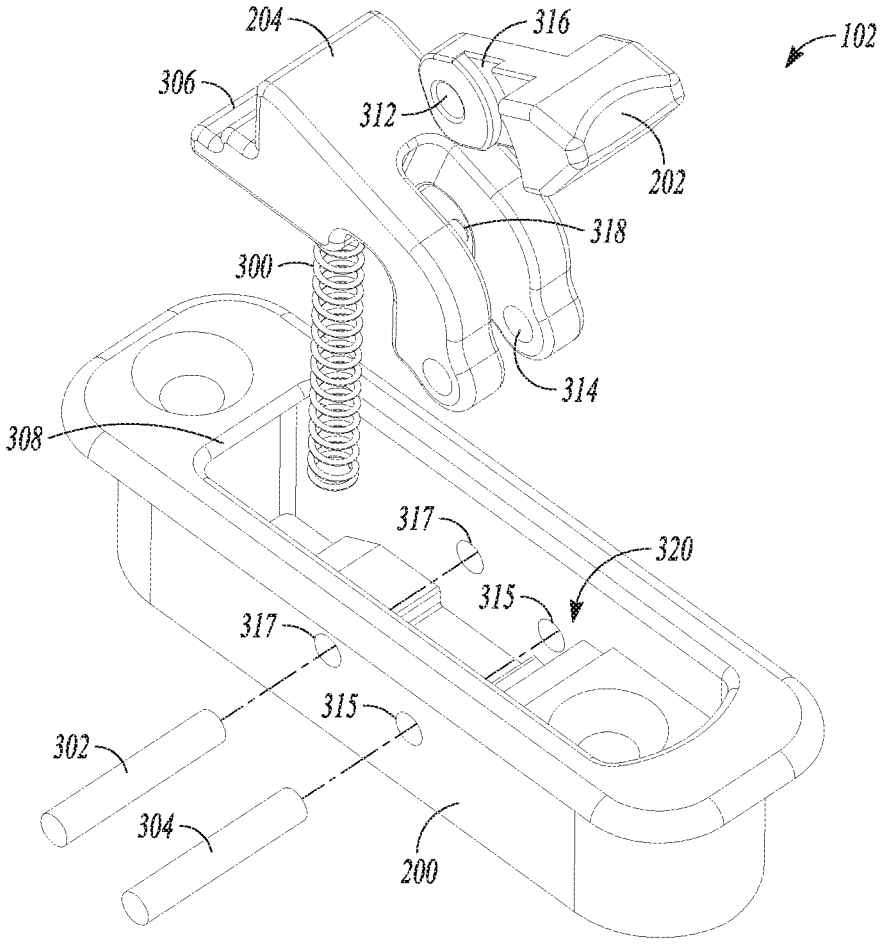
315

FIG. 3A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302
304
200

FIG. 3B

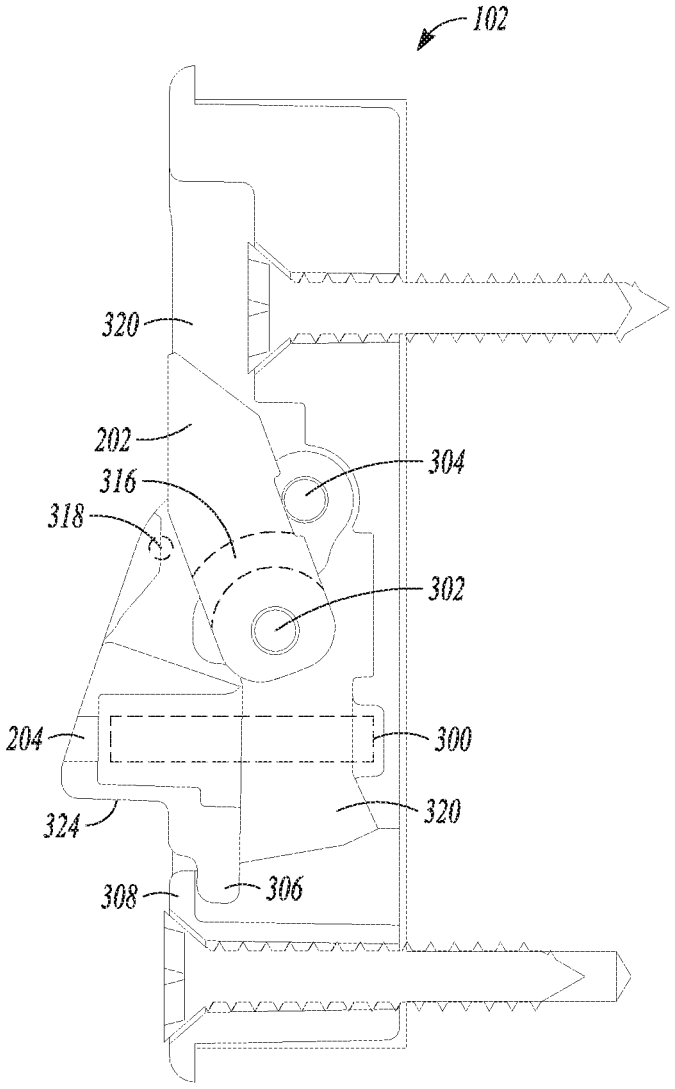

FIG. 3C

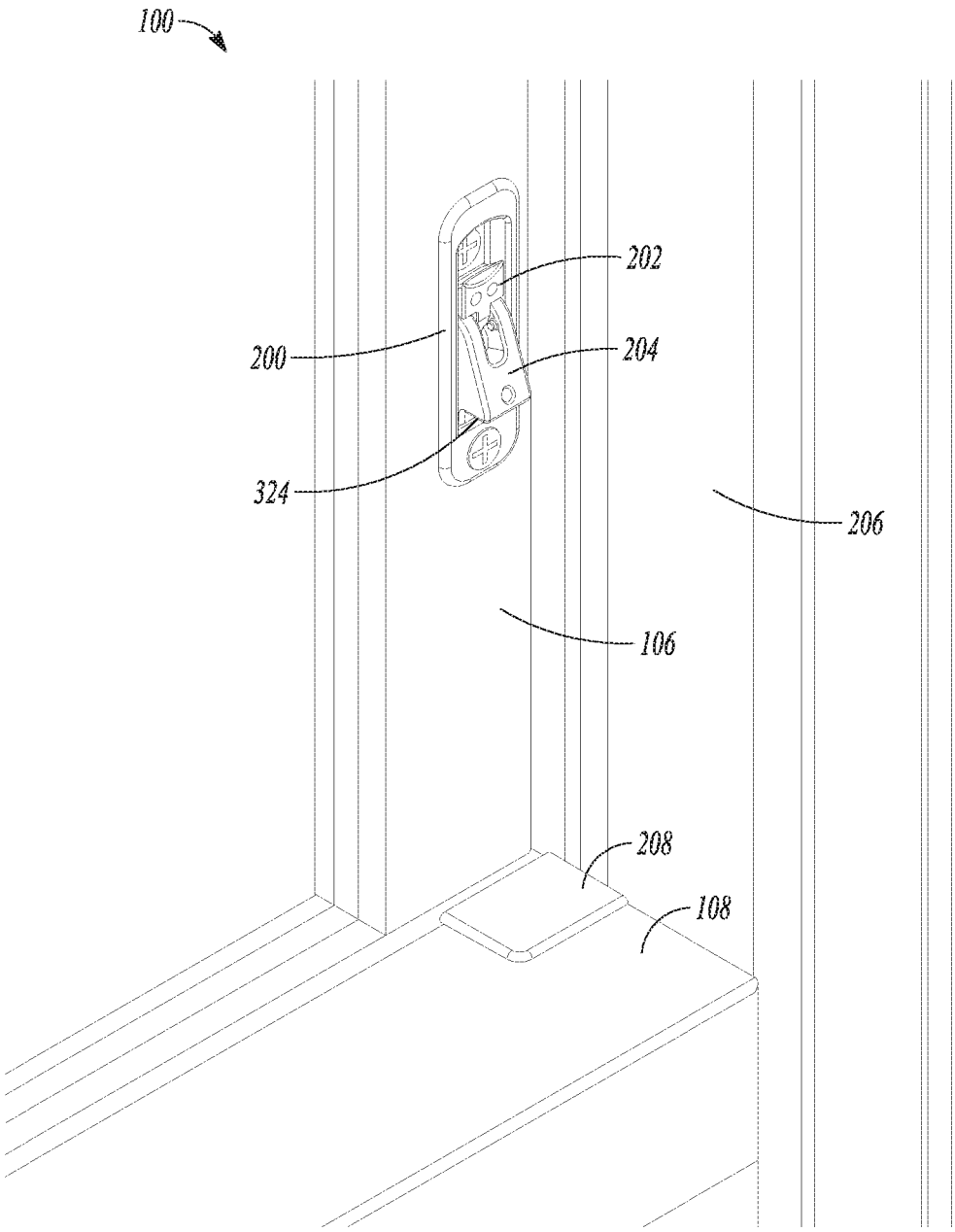

FIG. 4A

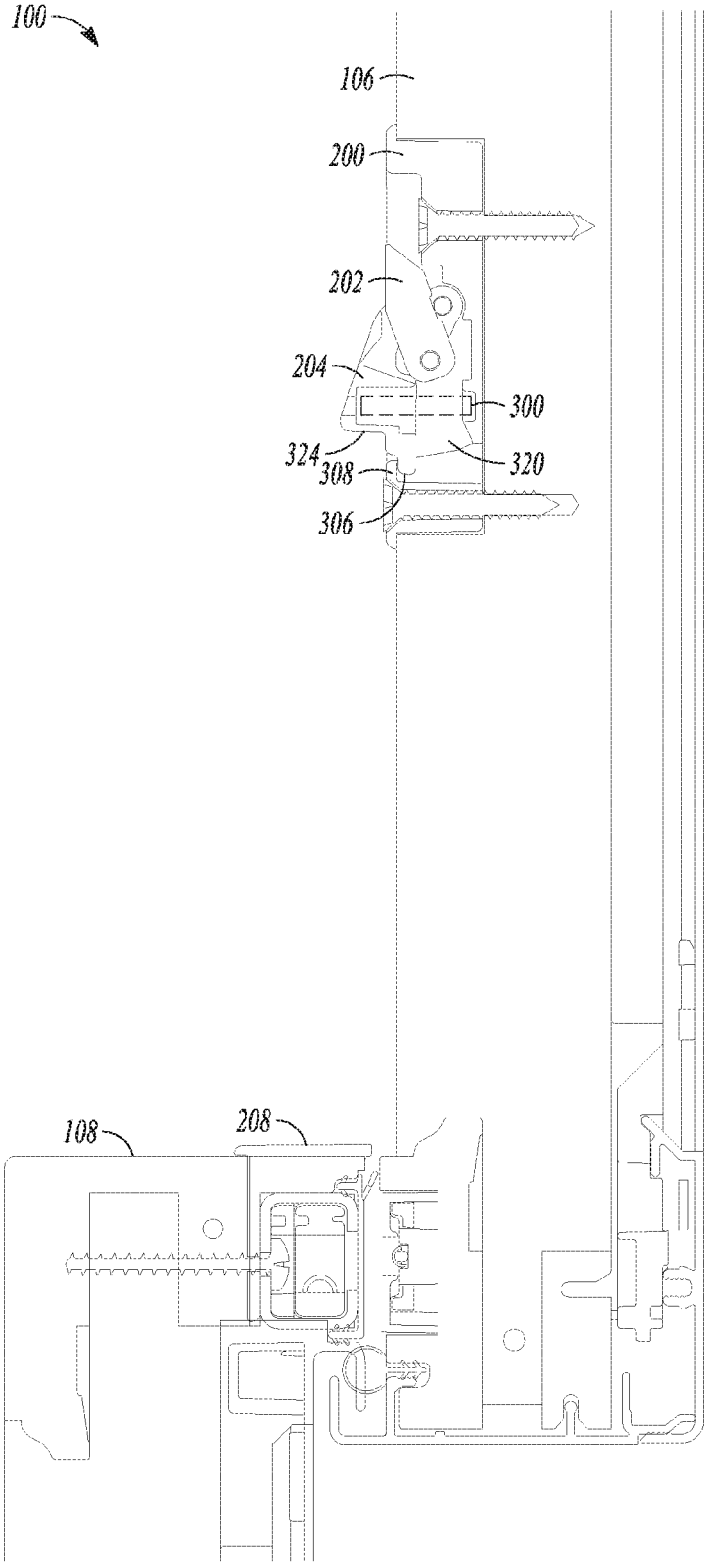

FIG. 4B

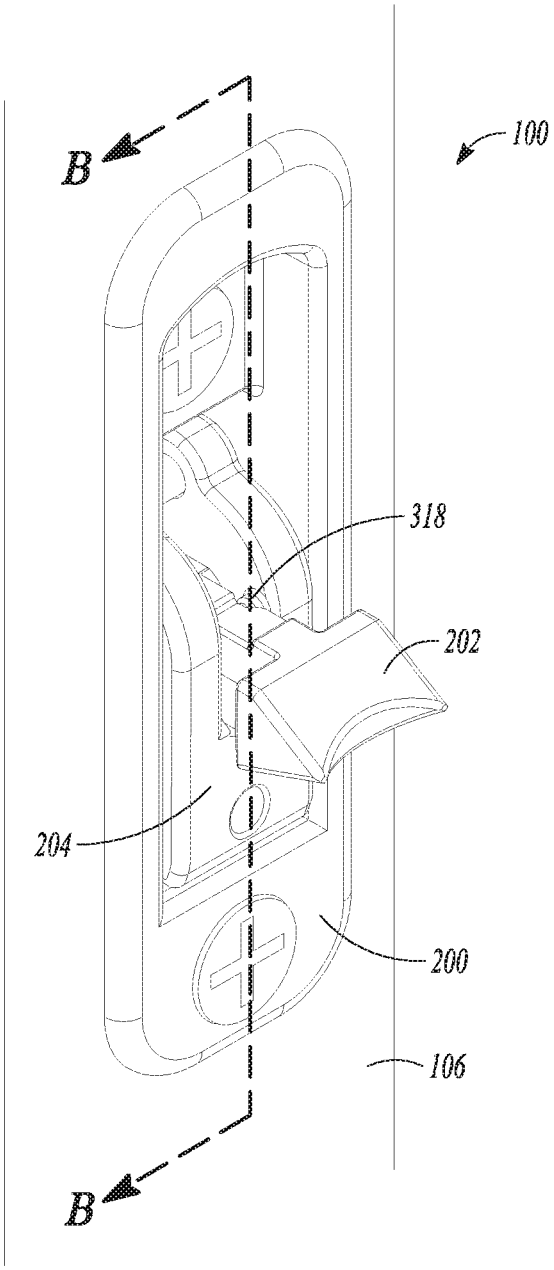

FIG. 5A

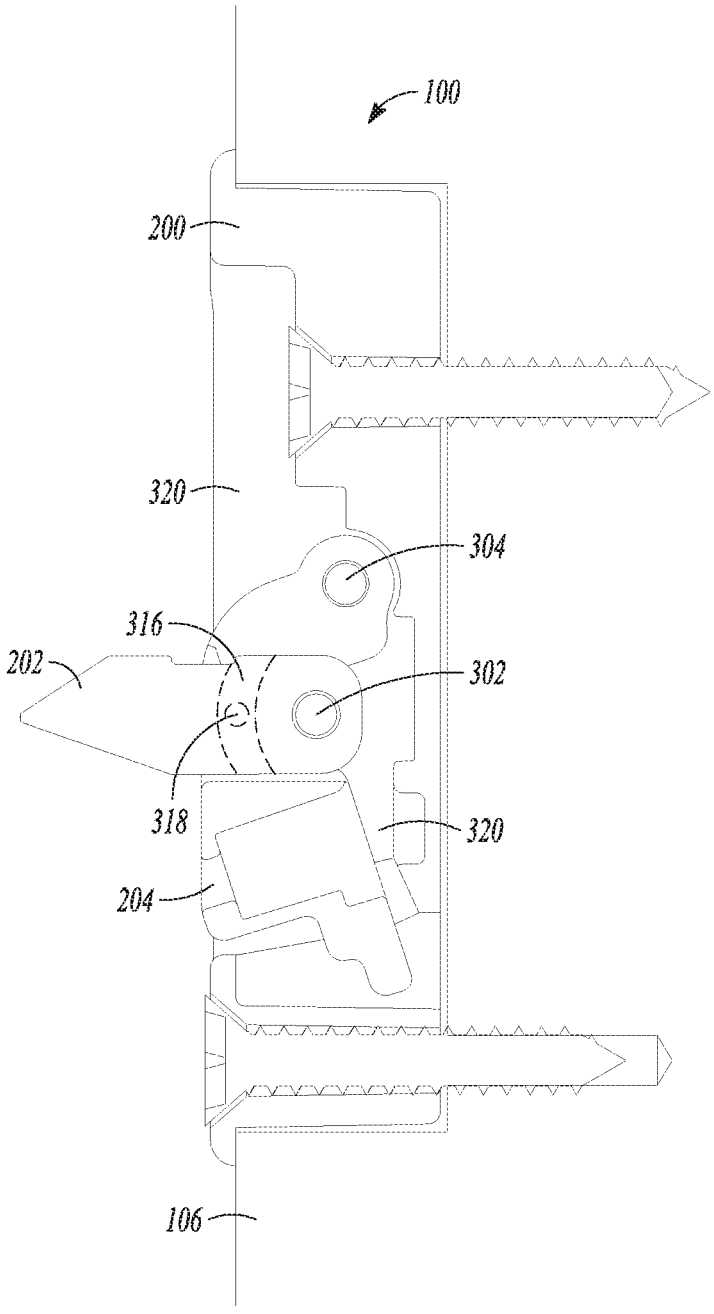

FIG. 5B

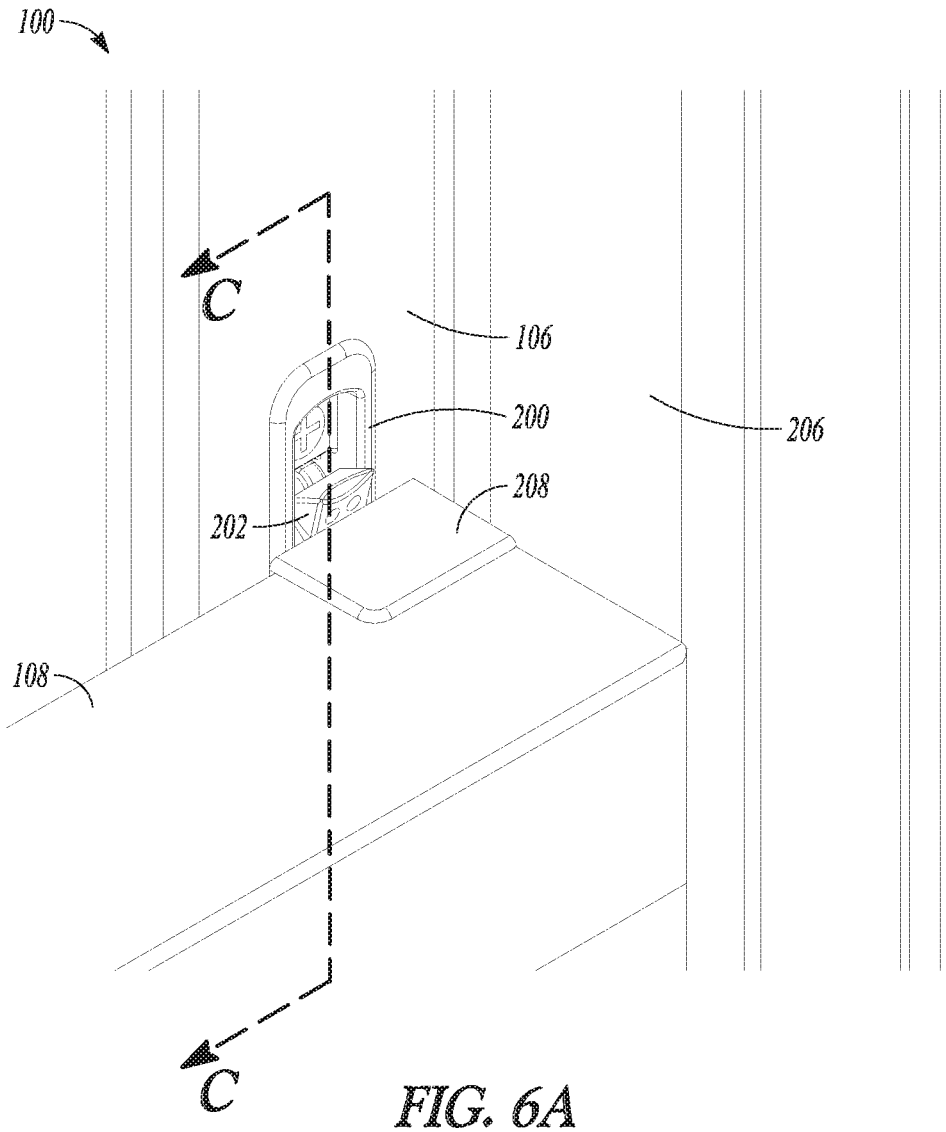

FIG. 6A

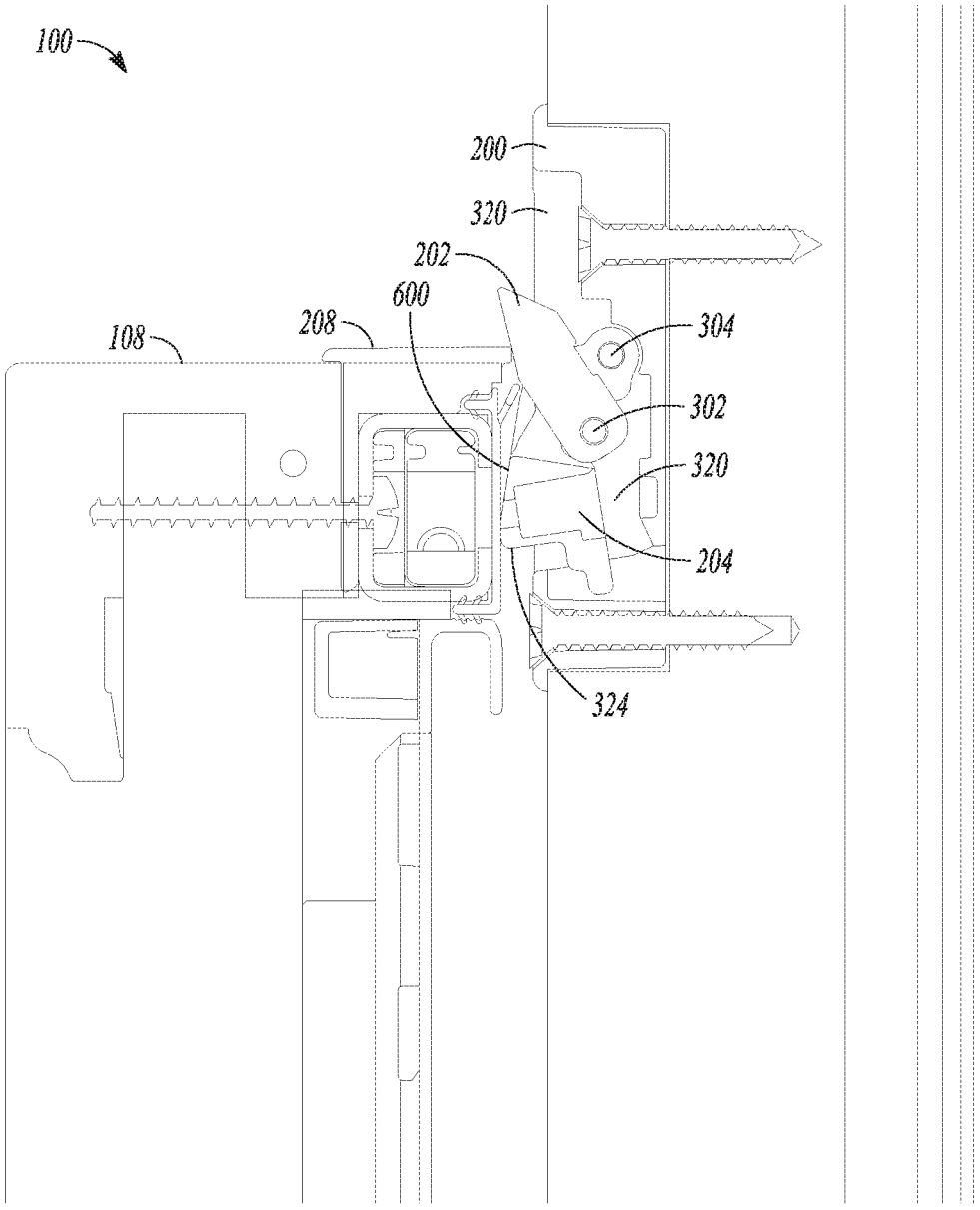

FIG. 6B

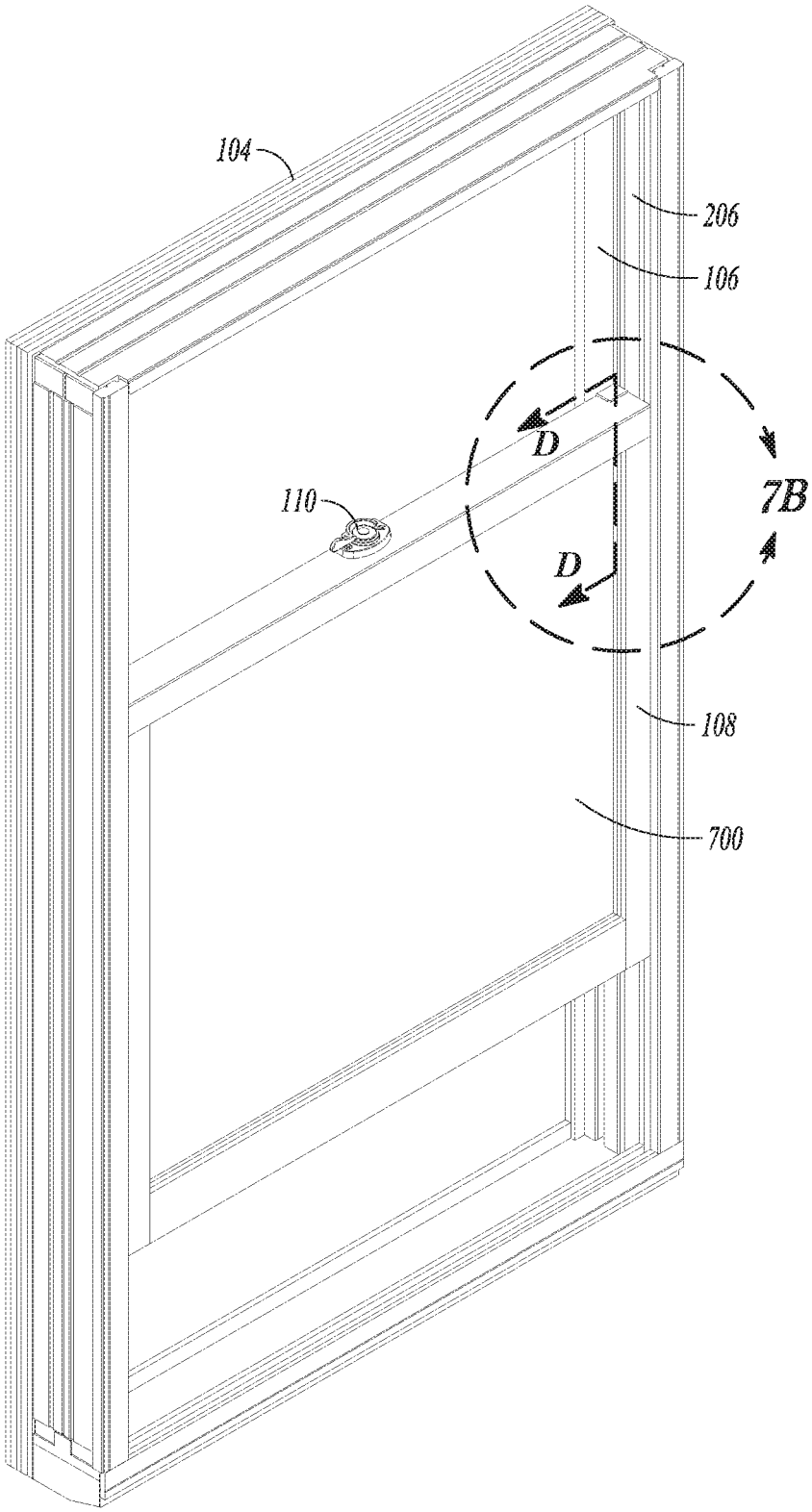

FIG. 7A

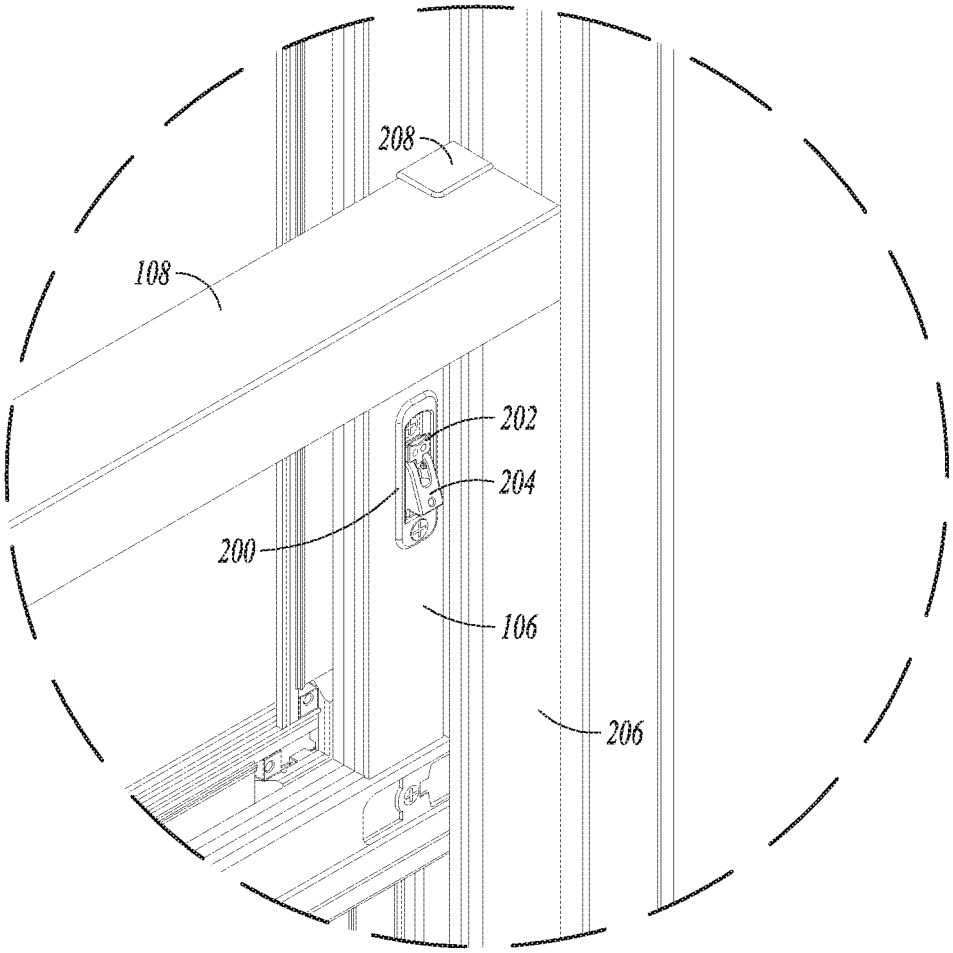

FIG. 7B

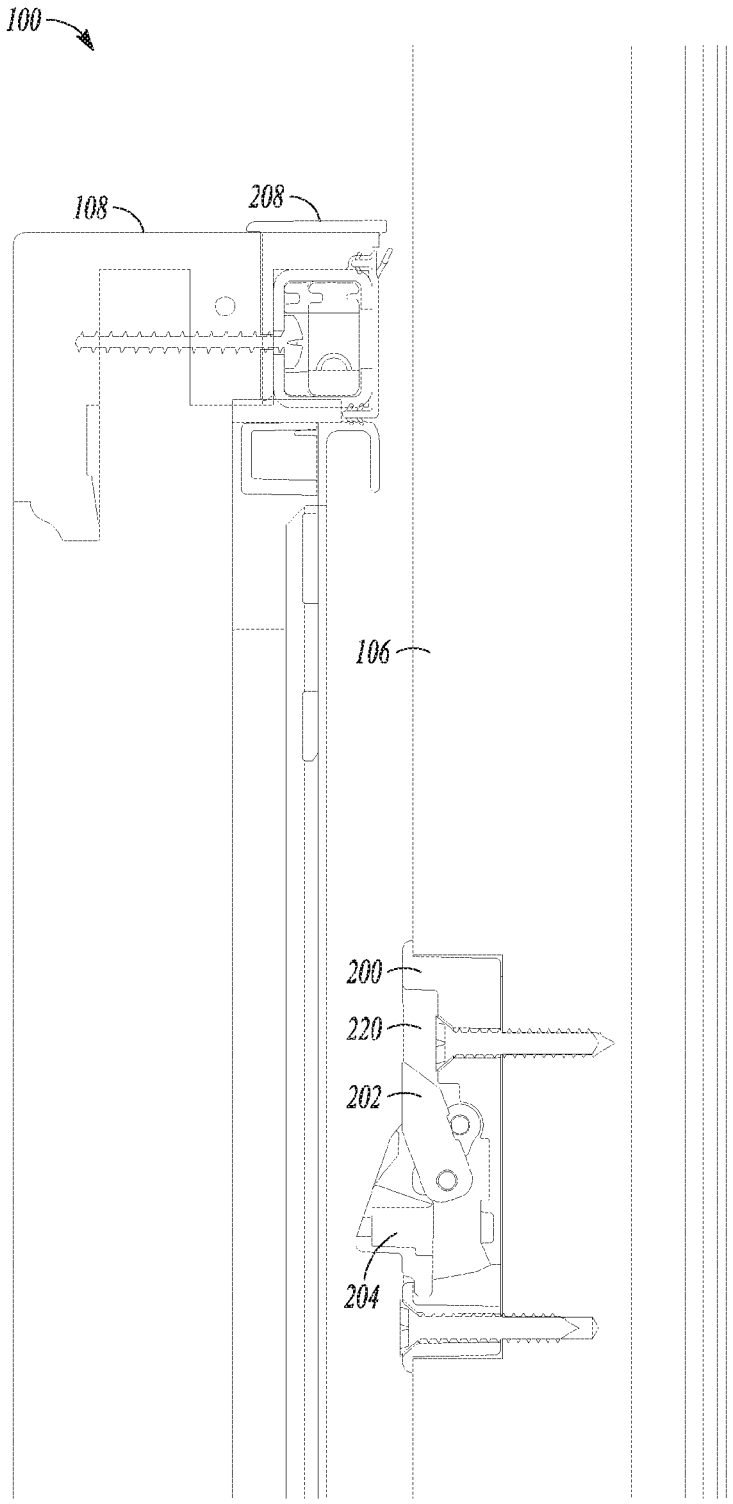

FIG. 7C

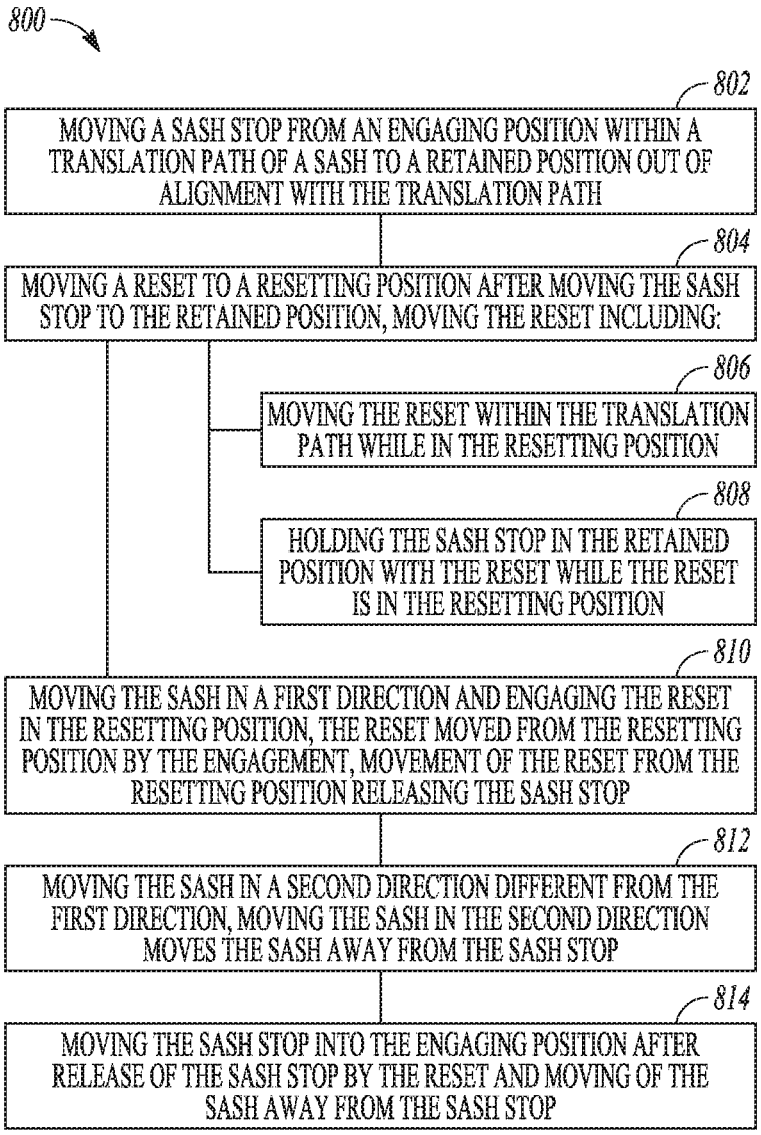
800
802
MOVING A SASH STOP FROM AN ENGAGING POSITION WITHIN A TRANSLATION PATH OF A SASH TO A RETAINED POSITION OUT OF ALIGNMENT WITH THE TRANSLATION PATH
804
MOVING A RESET TO A RESETTING POSITION AFTER MOVING THE SASH STOP TO THE RETAINED POSITION, MOVING THE RESET INCLUDING:
806
MOVING THE RESET WITHIN THE TRANSLATION PATH WHILE IN THE RESETTING POSITION
808
HOLDING THE SASH STOP IN THE RETAINED POSITION WITH THE RESET WHILE THE RESET IS IN THE RESETTING POSITION
810
MOVING THE SASH IN A FIRST DIRECTION AND ENGAGING THE RESET IN THE RESETTING POSITION, THE RESET MOVED FROM THE RESETTING POSITION BY THE ENGAGEMENT, MOVEMENT OF THE RESET FROM THE RESETTING POSITION RELEASING THE SASH STOP
812
MOVING THE SASH IN A SECOND DIRECTION DIFFERENT FROM THE FIRST DIRECTION, MOVING THE SASH IN THE SECOND DIRECTION MOVES THE SASH AWAY FROM THE SASH STOP
814
MOVING THE SASH STOP INTO THE ENGAGING POSITION AFTER RELEASE OF THE SASH STOP BY THE RESET AND MOVING OF THE SASH AWAY FROM THE SASH STOP

FIG. 8

WINDOW OPENING CONTROL DEVICE FOR HORIZONTAL AND VERTICAL SLIDING WINDOWS

CLAIM OF PRIORITY

This patent application claims the benefit of priority to U.S. Provisional Application No. 61/967,837, filed Mar. 27, 2014, which is hereby incorporated by reference herein in its entirety.

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TECHNICAL FIELD

This document pertains generally, but not by way of limitation, to control devices for the limited opening of windows

BACKGROUND

Accidental falls from elevated windows (for instance, second-floor windows or higher) are a safety concern, especially with young children. For instance, a small child might open a window or go to an already-open window and lean out, lean against a screen, climb out, or the like. The small child could lose his/her balance or the screen could give way, and the child could fall out of the window. Depending on the height of the window above ground level, such a fall could result in injury and/or death. Certain building standards have been developed to require that windows include features to limit the amount that the windows can be opened. For instance, ASTM F2090 addresses window fall prevention devices with emergency escape (egress) release mechanisms.

OVERVIEW

Brief Description of the Drawings

In the drawings, which are not necessarily drawn to scale, like numerals may describe similar components in different views. Like numerals having different letter suffixes may represent different instances of similar components. The drawings illustrate generally, by way of example, but not by way of limitation, various embodiments discussed in the present document.

FIG. **1** is a perspective view of one example of a window assembly with sash limiter assemblies in the engaging position.

FIG. **2** is a perspective view of the window assembly with a sash engaging with one or more sash stops.

FIG. **3**A is an exploded view of an example of a sash limiter assembly.

FIG. **3**B is an exploded view of an example of a sash limiter assembly.

FIG. **3**C is a detailed sectional view, taken at the line A-A of FIG. **1**, of the sash limiter assembly of FIGS. **3**A and **3**B.

FIG. **4**A is a perspective view of one example of a sash limiter assembly in a sash limiting configuration.

FIG. **4**B is a sectional view, taken at the line A-A of FIG. **1**, of the sash limiter assembly of FIG. **4**A.

FIG. **5**A is a perspective view of one example of a sash limiter assembly in a retained configuration with an example reset in the resetting position.

FIG. **5**B is a sectional view, taken at the line B-B of FIG. **5**A, of the sash limiter assembly of FIG. **5**A.

FIG. **6**A is a perspective view of one example of a sash limiter assembly with the sash engaged with the reset.

FIG. **6**B is a sectional view, taken at the line C-C of FIG. **6**A, of the sash limiter assembly of FIG. **6**A.

FIG. **7**A is a perspective view of one example of a sash moved past the sash limiter assembly.

FIG. **7**B is a detailed perspective view of the sash limiter assembly of FIG. **7**A.

FIG. **7**C is a sectional view, taken at the line D-D of FIG. **7**A of the sash limiter assembly of FIG. **7**A.

FIG. **8** is a block diagram of a method for operating one example of a sash limiter assembly.

DETAILED DESCRIPTION

FIG. **1** shows a perspective view of one example of a window assembly **100**. The window assembly **100**, as described herein, is installed in dwellings, commercial buildings, or the like. The views shown herein (e.g., FIG. **1**) are readily reoriented so that the window assembly **100** shown in a vertical orientation is also usable in a horizontal orientation. In an example, the window assembly **100** includes, but is not limited to, a window frame **104**, a first sash **106** (e.g., a top sash), a second sash **108** (e.g., a bottom sash), a lock **110** (e.g., a keeper), and one or more sash limiter assemblies **102**. The first sash **106** is slidably positioned within the window frame **104** and is thereby able to translate within the window frame **104**. In yet another example, the second sash **108** is slidably positioned within the window frame **104** and translates within the window frame **104**. In still another example, one of the first and second sashes **106**, **108** (the second sash **108** in FIG. **1**) are slidably positioned within the window frame **104** while the other sash is fixed within the window frame **104**. Optionally, the first and second sashes **106**, **108** translate horizontally, for instance, when the window assembly **100** is configured for a horizontal installation. While the examples described herein are provided in the form of a window, in other examples the devices and assemblies described herein are used in other fenestration assemblies including doors (e.g., sliding doors).

As described above, in use one or more of the first or second sashes **106**, **108** translates vertically or horizontally according to the window assembly **100** installation. The lock **110** shown in FIG. **1** is, in one example, a latch associated with the second sash **108** and is configured for receipt with a keeper coupled with the first sash **106**. The lock **110** fixes the first sash **106** and the second sash **108** and arrests both of the sashes from moving from the closed configuration (shown in FIG. **1**).

Referring again to FIG. **1**, in one example, one or more sash limiter assemblies **102** are coupled with the first sash **106** and configured to intercept and selectively prevent full translation of the second sash **108**. In another example, two or more sash limiter assemblies **102** are coupled to the first sash **106** and at least two assemblies **102** are positioned on opposed stiles **206** of the first sash **106**. Two or more sash limiter assemblies **102**

are installed on a product for further security, compliance with regulations or the like. Alternatively, the sash limiter assembly **102** is coupled to the window frame **104**. In yet another example, one or more sash limiter assemblies **102** are coupled to the window frame **104** and each is positioned on opposite members of the window frame **104** (e.g., the jambs).

The sash limiter assembly **102** is coupled to one or more of the first sash **106**, second sash **108**, the window frame **104** or the like by use of fasteners including, but not limited to, screws, bolts, nails or the like, for instance extending through corresponding fastener apertures of the limiter housing (**200** as described herein). In another example, the sash limiter assembly **102** is coupled to the first sash **106**, second sash **108**, or the window frame **104** by use of adhesives, welds, mechanical fittings or the like.

FIG. **2** is a detailed perspective view of the window assembly **100** of FIG. **1** in a partially open configuration with the second sash **108** engaged with a sash stop **204** of the sash limiter assembly **102**. As shown in FIG. **2**, the sash limiter assembly **102** includes, but is not limited to, a limiter housing **200**, a reset **202**, and a sash stop **204**. The sash stop **204** is deployed in FIG. **2** and intercepts the second sash **108** to prevent further translation (e.g., in the opening direction). As will be described in detail herein, the sash limiter assembly **102** is positioned between a sash limiting configuration and a resetting configuration. As described herein, in the sash limiting configuration the sash limiting assembly **102** prevents the translation of the first and second sash **106**, **108** beyond a specified opening. As shown in FIG. **2**, in the sash limiting configuration, the sash stop **204** is in an engaging position within the translation path of the second sash **108**.

As will be described herein, in a resetting configuration, the sash limiter assembly **102** allows the second sash **108** to translate past the sash limiter assembly **102**, for instance toward a full open position. Similarly, the first sash **106** is also movable to a fully open position. In the resetting configuration the sash stop **204** is in a retained position such that the sash stop **204** is out of alignment with the translation path of the second sash **108**. The sash stop **204** is optionally held in the retained position by the reset **202** and released from the retained position by movement of the reset **202**.

In one example, the sash limiter assembly **102** limits the travel of the first and second sashes **106**, **108** of the window assembly **100** to meet child fall protection codes. For instance, the sash limiter assembly **102** limits the opening of either the first or the second sash **106**, **108** to no more than 4 inches when installed at a corresponding position on the window assembly **100**. While in the sash limiting configuration the sash limiter assembly **102** prevents the second sash **108** from opening greater than 4 inches (based on the sash limiter assembly **102** installation). The sash stop **204** of the sash limiter assembly **102** extends from the first sash **106** (as shown in FIG. **2**) and also extends above the check rail of the second sash **108** (e.g., from the limiter housing **200**) and intercepts the second sash **108** or a stop plate **208** on the second sash **108**. To facilitate movement of the first and second sashes **106**, **108** beyond the sash stop **204** the sash limiter assembly **102** is set to a bypass mode (e.g., the resetting configuration) by a two-step operation to facilitate opening of the sash fully, such as for egress. In yet another example, and as described herein, movement of the sash (e.g., the first or second sash **106**, **108**) past the sash limiter assembly **102** in the resetting configuration automatically resets the sash limiter assembly **102** to the sash limiting configuration (releases the sash stop **204**) and thereby limits opening of either of the sashes **106**, **108** to the selected opening (e.g., 4 inches) according to the installation of the limiter assembly **102**.

Optionally, in the resetting configuration (further shown herein) the sash limiter assembly **102** is substantially flush with the component it is installed with (e.g., a sash, frame portion or the like). In the sash limiting configuration the sash stop **204** projects from the component (e.g., the first sash **106** or frame **104**). Because the sash limiter assembly **102** is flush or nearly flush in the resetting configuration (e.g., the bypass mode), the sash limiter assembly **102** is used in a wide array of window products having varying offsets and clearances between the first and second sashes **106**, **108**. Stated another way, the compact shape of the sash limiter assembly **102**, for instance in the resetting configuration, allows for the use of the sash limiter assembly **102** in a variety of windows having differing spacing between interior and exterior sashes (i.e., the first and second sashes **106**, **108**).

FIG. **3**A is a first exploded view of an example of the sash limiter assembly **102**. The exemplary sash limiter assembly **102** shown includes a sash stop **204** and a reset **202** configured to release the sash stop **204** from the resetting configuration (see FIGS. **5**A, B). Optionally, the sash stop **204** and the reset **202** are housed in a limiter housing **200**, and the limiter housing **200** is fit within a corresponding recess in the window assembly **100** (e.g., within a stile of a sash or a portion of the frame **104**). In another example, the sash stop **204** and the reset **202** are installed within a recess of the window assembly **100** without the limiter housing **200**. As shown in FIG. **3**A, the sash stop **204** is rotatably coupled with the limiter housing **200** with a stop pivot **304** received within a stop pivot recess **314**. Similarly the reset **202** is rotatably coupled with the limiter housing **200** with a reset pivot **302** received within a reset pivot recess **312**.

Referring again to FIG. **3**A, a biasing element **300** is interposed between the sash stop **204** and the limiter housing **200** (or sash or frame component if the housing is absent). The biasing element **300** includes, but is not limited to, a compression spring, torsion spring (e.g., wrapped around the stop pivot **304**), elastomer or the like. In one example, the biasing element **300** includes, but is not limited to, one or more of steel, stainless steel or the like. The limiter housing **200** includes a recess, cavity or the like to retain an end of the biasing element opposed to the end coupled with the sash stop **204**. In one example, the limiter housing **200** includes, but is not limited to, one or more of zinc, aluminum, a polymer or the like. Optionally, the limiter housing **200** is constructed by way of die casting, injection molding or the like. The sash stop **204** has a corresponding recess within the sash stop **204** to retain an end of the biasing element **300** within the sash stop **204**. During assembly, the biasing element **300** is placed in the limiter housing **200** (e.g., within a recess or cavity in the housing) and the sash stop **204** is coupled with the limiter housing **200** such that the sash stop flange **306** is placed under a housing flange **308** and the biasing element **300** is placed inside the recess within the sash stop **204**. The sash stop pivot **304** is inserted through the stop pivot recess **314** and aligned holes **315** provided on the limiter housing **200**. In one example, the sash stop **204** includes, but not limited to, one or more of zinc, aluminum, a polymer or the like. Optionally, the sash stop **204** is constructed by way of die casting, injection molding or the like

The stop pivot **304** in combination with the housing flange **308** retains the sash stop **204** within the limiter housing **200** (e.g., within a limiter cavity **320**). Additionally, the sash stop **204** is able to rotate about the stop pivot **304**. The biasing element **300** biases the sash stop **204** toward the engaging

position (e.g., projected as shown in FIG. **2**) with the sash stop **204** within the translation path of the second sash **108**. When the sash stop **204** is in the engaging position, the sash stop flange **306** is engaged with the housing flange **308** and held at the engaging position. Further, the housing flange **308** prevents additional rotation of the sash stop **204** when engaged by the second sash **108** (or a stop plate **208**) at a sash intercepting face **324** of the sash stop **204**. Stated another way, the housing flange **308** in combination with the sash stop **304** (e.g., the sash stop flange **306**) locks the sash stop **304** in place and robustly supports the sash stop **304** against further rotation caused by continued movement of the second sash **108**. In another example, the stop pivot **304** provides an additional support point for the sash stop **204** to prevent its displacement as the second sash **108** engages with the sash intercepting face **324**. In one example, the stop pivot **304** includes, but not limited to, one or more of steel, stainless steel or the like. Optionally, the stop pivot **304** is constructed by way of stamping. The combination of the stop pivot **304** and the sash stop flange **306** distribute the load placed on the sash limiter assembly **102**, by the second sash **108**, throughout the limiter housing **200**. In one example, the reset **202** includes, but not limited to, one or more of zinc, aluminum, a polymer or the like. Optionally, the reset **202** is constructed by way of die casting, injection molding or the like.

FIG. **3**B is an exploded view of the sash limiter assembly **102** of FIG. **3**A and shows another side of the sash limiter assembly **102**. As shown, the reset **202** is placed in the void between the sash stop **204** and the stop pivot **304**. The reset pivot **302** is inserted through holes **317** on the limiter housing **200** aligned with the reset pivot recess **312**. The reset pivot **302** provides an axis of rotation for the reset **202**. In one example, the reset pivot **302** includes, but not limited to, one or more of steel, stainless steel or the like. Optionally, the reset pivot **302** is constructed by way of stamping.

In one example, the reset **202** has a retaining pin channel **316**. The retaining pin channel **316** is sized and shaped for reception of a stop retaining pin **318** within the retaining pin channel **316**. As shown in FIG. **3**A, the stop retaining pin **318** extends from the sash stop **304**. In another example, the retaining pin channel **316** is located on the sash stop **204**, and the stop retaining pin **318** is located on the reset **202**. As will be described herein, the engagement of the stop retaining pin **318** with the walls of the retaining pin channel **316** facilitates the retention of the sash stop **204** in a depressed position for the resetting configuration. For instance, rotation of the reset **202** to the resetting position (extending from the limiter housing **200**) forces the sash stop **204** into the limiter housing **200** as the stop retaining pin **318** (and the sash stop **204**) is forced to travel along the retaining pin channel **316**. The engagement of the retaining pin channel **316** (the channel walls) with the stop retaining pin **318** holds the stop **204** in the retained position with the reset **202** extending upwardly from the housing **200** (and in line with the translation of the second sash **108**). In one example, the reset **202** includes, but not limited to, one or more of zinc, aluminum, a polymer or the like. Optionally, the reset **202** is constructed by way of die casting, injecting molding or the like

FIG. **3**C is a sectional view of the sash limiter assembly **102** of FIG. **3**A. In an example, when the sash limiter assembly **102** is in the sash limiting configuration, the reset **202** is within the limiter cavity **320**. When the user wants to change the sash limiter assembly **102** into the bypass mode, the user depresses the sash stop **204** into the limiter cavity **320** (overcoming the bias of the biasing element **300**). The depression of the sash stop **204** aligns the retaining pin channel **316** (See FIG. **3**B) of the reset **202** with the stop retaining pin **318** (See FIG. **3**A) of the sash stop **204**. Stated another way, the stop retaining pin **318** and the retaining pin channel **316** are out of alignment if the sash stop **204** is not depressed to prevent the reset **202** from rotating about the reset pivot **302** in one example.

In another example when the window assembly **100** is in a vertical orientation (as shown in FIG. **1**), the reset **202** is loosely coupled with the reset pivot **302** to allow free rotation (e.g., because of gravity). The loose coupling between the reset **202** and the reset pivot **302** allows the reset **202** to automatically move toward the resetting position when the sash stop **204** is depressed into the limiter cavity **320** (e.g., the reset **202** falls and rotates according to gravity). Stated another way, when the sash stop **204** is depressed, the force of gravity will move the reset **202** toward the resetting position. When two or more sash limiter assemblies **102** are installed on a window assembly **100**, the automatic movement of the reset **202** reduces user interaction with the sash limiter assembly **102** while still complying with regulations (e.g., the requirement for two interactions with the window assembly **100** before the second sash **108** or first sash **106** will translate past a specified distance).

Alternatively, one or more sash limiter assemblies **102** are installed in a window assembly **100** that is in a horizontal orientation while still complying with regulations. In an example, one sash limiter assembly **102** is installed because the user manually moves the reset **202** into the resetting position (e.g., after depressing the sash stop **204**). In the horizontal configuration, the user thereby performs two or more operations on the sash limiter assembly **102** to open the second sash **108** (or first sash **106**) more than a specified distance (based on one or more of installation and in compliance with a regulation).

Referring again to FIG. **3**C, when the user rotates the reset **202**, the stop retaining pin **318** (See FIG. **3**A) moves inside the retaining pin channel **316** (See FIG. **3**B). In one example, the reset **202** rotates a specified amount (e.g., around 90 degrees) before the stop retaining pin **318** reaches the end of the retaining pin channel **316**. In another example, the reset **202** rotates a specified amount before the reset **202** intercepts a portion of the sash stop **204** (e.g., a top of the depressed sash stop). In yet another example, with the stop retaining pin **318** within the retaining pin channel **316**, the sash stop **204** is held in the depressed position and prevented from rising to the engaging position through bias of the biasing element **300** (i.e., the sash stop is in the retained position). Stated another way, when the reset **202** is rotated and the stop retaining pin **318** is within the retaining pin channel **316**, the sash stop **204** is locked in the retained position and the sash limiter assembly is in the resetting configuration (e.g., the bypass mode).

As described in further detail herein, when the sash limiter assembly **102** is in the bypass mode, the sash stop **204** is retained substantially within the limiter cavity **320** (See FIG. **5**B). In the bypass mode, the sash intercepting face **324** of the sash stop **204** is positioned outside of the translation path of the second sash **108** and the second sash **108** is able to translate past the sash stop **204**. In another example with the sash limiter assembly **102** installed with the second sash **108** or the frame, in the bypass mode the sash intercepting face **324** of the sash stop **204** is positioned outside of the translation path of the first sash **106** and the first sash **106** is able to translate past the sash stop **204**.

As described further herein, as the second sash **108** translates past the sash stop **204** (depressed and retained in the limiter cavity **320**), the second sash **108** engages with and rotates the reset **202**. The second sash **108** rotates the reset **202** and thereby releases the sash stop **204**. Rotation of the reset

202 moves the stop retaining pin 318 out of the retaining pin channel 316 and thereby releases the sash stop 204. The sash limiter assembly 102 accordingly transitions out of the bypass mode (i.e., the resetting configuration) and the sash stop 204 is biased back toward the engaging position (e.g. projected as shown in FIG. 2 once the second sash 108 is removed from over top of the sash stop 204).

FIG. 4A is a detailed perspective view of the window assembly 100 with the sash limiter assembly 102 in a sash limiting configuration. With the sash limiter assembly 102 in the sash limiting configuration the sash stop 204 is in an engaging position such that the sash intercepting face 324 (See FIG. 3C) of the sash stop 204 will intercept the second sash 108 (or the stop plate 208 of the second sash 108) with movement of the second sash toward the sash stop. In the sash limiting configuration, the sash limiter assembly 102 prevents the second sash 108 from translating past a certain point (dependent upon installation location). In another example, the sash limiter 102 prevents the second sash 108 from opening greater than 4 inches (based on the sash limiter assembly 102 installation). As described herein, the user is able to translate the second sash 108 a specified distance until the second sash 108 is intercepted by the sash limiter assembly 102 (e.g., after the second sash 108 translates four inches).

FIG. 4B is a sectional view of the window assembly 100 of FIG. 4A. As described herein, in the sash limiting configuration the sash stop 204 is biased by the biasing element 300 toward the engaging position with the sash stop 204 is positioned in the translation path of the second sash 108. The bias towards the engaging position is overcome when the user depresses the sash stop 204 into the limiter cavity 320. In combination with the coupling of the sash stop 204 to the stop pivot 302 (FIG. 3C) the engagement of the sash stop flange 306 and the housing flange 308 locks the sash stop 304 in place and robustly supports the sash stop 304 against further rotation otherwise caused by continued movement of the second sash 108.

FIG. 5A is a detailed perspective view of an example of the window assembly 100 with the sash limiter assembly 102 in the resetting configuration. As described herein, the reset 202 is rotated into the translation path of the second sash 208 under certain conditions, for instance where opening of a sash, such as the second sash 108, beyond the sash limiter assembly 102 is desired (e.g., for egress). In one example, the reset 202 is rotated when the stop retaining pin 318 is in alignment with the retaining pin channel 316. As shown in FIG. 5A, the sash stop 204 is depressed substantially within the limiter cavity 320 (e.g., the sash stop 204 is flush or recessed relative to the outer face of the sash 106). With the sash stop 204 depressed, the stop retaining pin 318 and the retaining pin channel 316 are aligned and the reset 202 is rotated from its normal position within the limiter cavity 320 to a resetting position, wherein the reset 202 is in the translation path of the second sash 108. With the reset 202 moved to the resetting position the sash stop 204 is retained substantially within the limiter cavity 320. For instance, the rotation of the reset 202 positions the stop retaining pin 318 in engagement with one or more walls of the retaining pin channel 316. The engagement of the retaining pin channel 316 (the channel walls) with the stop retaining pin 318 holds the stop 204 in the retained position. Optionally, and as discussed herein the stop retaining pin 318 and the retaining pin channel 316 are reversed with the pin on the reset 202 and the channel on the sash stop 204. In another example other features including, but not limited to, gears, latches, rollers or the like are used between one or more of the reset 202, the sash stop 204, the limiter housing 200 (or the sashes or frame) to retain the sash stop 204 in the depressed position while at the same time preparing the sash limiter assembly 102 for resetting with movement of one or more of the sashes 106, 108.

FIG. 5B is a sectional view of the window assembly 100 of FIG. 5A with the reset 202 in the resetting position. In an example, the reset 202 in the resetting position places the reset 202 within the translation path of the second sash 108 while the sash stop 204 is retained within the limiter cavity 320. In the resetting position, the second sash 108 is able to translate past the sash stop 204 (e.g., to provide a large opening) and engages with the reset 202. In another example, the first sash 106 is able to translate toward an open position (i.e., a larger opening than with the sash stop 204 in the sash limiting configuration). Stated another way, when the sash limiter assembly 102 is in the resetting configuration, one or more of the first or the second sashes 106, 108 may be translated past the sash limiter assembly 102 and reset the sash limiter assembly 102 as described herein.

FIG. 6A is a detailed perspective view of the window assembly 100 with the stop plate 208 of the second sash 108 engaged with the reset 202. As the second sash 108 engages with the reset 202 and continues to move over the sash limiter assembly 102 the reset 202 is moved from its resetting position toward its stowed position within the limiter cavity 320. In the stowed position reset 202 is disengaged from sash stop 204 to accordingly release the sash stop to project from the limiter housing 200 (e.g., to project from the housing or the sash after disengagement of the sash from over top of the sash stop 204).

FIG. 6B is a sectional view of the window assembly 100 of FIG. 6B. As shown in FIG. 6A and shown again in FIG. 6B, the stop plate 208 of the second sash 108 engages with the reset 202 to move the reset 202 (e.g., rotate the reset) from the resetting position toward the stowed position within the limiter cavity 320. Rotation of the reset 202 moves the stop retaining pin 318 out of the retaining pin channel 316 (See FIGS. 3A and 3B) and thereby releases the sash stop 204 to transition back to the engaging position (shown in FIGS. 4A, B) after the sash is moved from over top of the sash stop. The sash limiter assembly 102 accordingly automatically transitions out of the bypass mode (i.e., the resetting configuration) and the sash stop 204 is biased back toward the engaging position (e.g. projected as shown in FIGS. 2, 4A, B) once the second sash 108 is removed from over top of the sash stop 204.

The engagement of the second sash 108 with the reset 202 and movement of the reset 202 by the second sash 108 releases the sash stop 204. With the sash positioned as shown in FIGS. 6A, B the sash intercepting face 324 of the sash stop 204 is not engaged with the second sash 108 (and the second sash 108 is not prevented from translating towards the fully open position). Instead, a sash stop ramp 600 of the sash stop 204 slides along the second sash 108 as the second sash 108 travels over the sash limiter assembly 102 (e.g., towards a fully open position or toward the closed position). Once the second sash 106 is removed from over the top of the sash stop 204 (e.g., translated past the sash stop 204 during closing movement), the sash stop 204 moves and projects as shown in FIG. 2, for instance according to the bias of the biasing element 300.

FIG. 7A is a perspective view of an example of a window assembly 100. The second sash 108 is in a partially open position (e.g., is open greater than the limited position shown in FIG. 2). The second sash 108 is positioned over a portion of the first sash 106 and a lower pane of glass 700 obscures the sash limiter assembly 102 from view. The detail of FIG. 7A, FIG. 7B, shows the pane of glass 700 removed to expose the

sash limiter assembly **102**. In an example with the second sash **108** translated past the sash limiter assembly **102** (e.g., after having reset the sash limiter assembly **102** as described herein), the second sash **108** is able to continue translating toward a fully open position, or is able to translate towards the fully closed position. As described above, the sash stop **204**, previously released with movement of the reset **202**, is biased outwardly but fails to interrupt movement of the second sash **108** until the second sash **108** is moved from an overlying position. Stated another way, the sash stop **204** projects to the engaging position once the second sash **108** is moved out of the way.

As described above, FIG. **7**B is a detailed perspective view of the window assembly **100** of FIG. **7**A with the lower pane of glass **700** removed to show the otherwise obscured sash limiter assembly **102**. As described herein, the second sash **108** translates past the sash limiter assembly **102** once the sash limiter assembly **102** is in the resetting configuration (e.g., the sash stop **204** is depressed, held and then eventually released by the reset **202**). When the second sash **108** has translated past the sash limiter assembly **102**, the second sash **108** translates freely within the window frame **104** (i.e., towards the fully closed or fully open position) without interception by the sash limiter assembly **102**. The second sash **108** translates freely because the second sash **108** has engaged and moved the reset **202** while the sash stop **204** was retained in the depressed position. While the second sash **108** remains positioned over the released sash stop **204** the sash is able to move freely. The second sash **108** freely translates because the second sash **108** will not engage with the sash intercepting face **324** until the second sash **108** is moved toward the fully closed position and translates past the sash stop **204**. However, once the second sash **108** translates past the sash stop **204**, the sash stop **204** projects outwardly from the limiter housing **200** to the engaging position automatically (e.g., according to the biasing element **300**). To facilitate opening of the second sash **108** past the sash stop **204** again the user places the sash limiter assembly **102** into the resetting configuration (e.g., by depressing the sash stop **204** and moving the reset **202** to hold the sash stop **204** in the depressed position).

FIG. **7**C is a sectional view of the window assembly **100** of FIG. **7**A. As described herein, the second sash **108** is able to translate toward the fully open position or translate toward the fully closed position after movement of the reset **202** and release of the sash stop **204**. As the user translates the second sash **108** from the position shown in FIG. **7**A toward the fully closed position and past the sash stop (e.g., the top of the second sash passes over the sash stop **204**) the second sash **108** slides along the sash stop ramp **600** and past the sash stop **204**. Stated another way, when the second sash **108** is in the position shown in FIG. **7**A, the sash stop **204** allows for full opening of the second sash **108** (and the first sash **106**) toward the fully closed position. It is after passage of the second sash **108** (or first sash **106**) to uncover or expose the released sash stop **204** and allow the stop to project to the engaged position that further movement of the second sash **108** (or first sash **106**) is limited.

FIG. **8** shows one example of a method **800** for using a sash limiter assembly. In describing the method **800**, reference is made to one or more components, features, functions and steps previously described herein. Where convenient, reference is made to the components, features, steps and the like with reference numerals. Reference numerals provided are exemplary and are not exclusive. For instance, components, features, functions, steps and the like described in the method **800** include, but are not limited to, the corresponding numbered elements provided herein, other corresponding features described herein (both numbered and unnumbered) as well as their equivalents.

At step **802** the method **800** includes moving a sash stop **204** from an engaging position within a translation path of either a first or a second sash **106**, **108** to a retained position out of alignment with the translation path. The translation path of either the first or the second sash **106**, **108** is the space through which the first or second sash **106**, **108** moves within the window frame **104**. In an example and as described herein, the sash stop **204** is retained within the limiter cavity **320**. In another example, the sash stop **204** is retained within a recess of the window assembly **100** without the limiter housing **200**. In one example, moving the sash stop **204** includes depressing the sash stop **204** relative to the reset **202**. In another example, moving the sash stop **204** includes rotating the sash stop **204** relative to the reset **202**. In yet another example, moving the sash stop **204** includes aligning a stop retaining pin **318** with a retaining pin channel **316**.

At stet **804** the method **800** includes moving a reset **202** to a resetting position after moving the sash stop **204** to the retained position. In one example, at Step **806** the method **800** includes moving the reset **202** within the translation path of either the first or the second sash **106**, **108** while in the resetting position. In another example, at Step **808** the method **800** includes holding the sash stop **204** in the retained position with the reset **202** while the reset **202** is in the resetting position. In yet another example, moving the reset **202** includes rotating the reset **202** relative to the sash stop **204**. In still yet another example, moving the reset **202** includes moving the reset **202** according to alignment of the stop retaining pin **318** with the retaining pin channel **316**. Alternatively, holding the sash stop **204** in the retained position includes holding the stop retaining pin **318** in the retaining pin channel **316**. As described herein, the stop retaining pin **318** engages with the walls of the retaining pin channel **316**. The engagement of the stop retaining pin **318** with the walls of the retaining pin channel **316** facilitates the retention of the sash stop **204** in a depressed position for the resetting configuration.

At step **810** the method **800** includes moving either the first or second sash **106**, **108** in a first direction (e.g., toward the fully open position) and engaging the reset **202** in the resetting position, the reset **202** is moved from the resetting position by the engagement, movement of the reset **202** from the resetting position releases the sash stop **204**. For instance in one example, the reset **202** extends from the limiter housing **200** and is accordingly in the translation path. The second sash **108** translates and is intercepted by the reset **202**. The reset **202** is rotated toward the limiter housing **200** with continued movement of the second sash **108**. In one example, the rotation of the reset **202** disengages the stop retaining pin **318** from the retaining pin channel and releases the sash stop **204** from the retained position.

At step **812** the method **800** includes moving either the first or the second sash **106**, **108** in a second direction (e.g., towards the fully closed position) different from the first direction, moving the first or second sash **106**, **108** in the second direction moves the first or second sash **106**, **108** away from the sash stop **204**.

At step **814** the method **800** includes moving the sash stop **204** into the engaging position after release of the sash stop **204** by the reset **202** and moving of either the first or second sash **106**, **108** away from the sash stop **204**. In an example, the biasing element **300** moves (i.e., biases) the sash stop **204** towards the engaging position.

The method **800** includes arresting movement of either the first or second sash **106**, **108** in the first direction (e.g., towards the fully open position) with the sash stop **204** in the engaging position. For instance, the sash intercepting face **324** of the sash stop **204** engages with the second sash **108** and prevents the further translation (i.e., arrests movement) of either the first or second sash **106**, **108**.

VARIOUS NOTES & EXAMPLES

Example 1 can include subject matter, such as can include a window assembly including a sash limiter assembly, the sash limiter assembly comprising: a limiter housing configured for installation in one or more of a sash or a window frame of a window; a sash stop movably coupled with the limiter housing, the sash stop movable between engaging and retained positions; a reset movably coupled with the limiter housing, the reset movable into a resetting position; and wherein the sash limiter assembly is configured for positioning between a sash limiting configuration and a resetting configuration: in the sash limiting configuration the sash stop is in the engaging position and configured for positioning in a translation path of the sash, and in the resetting configuration the sash stop is held in the retained position by the reset in the resetting position, in the retained position the sash stop is configured for positioning out of alignment with the translation path, and in the resetting position the reset is configured for positioning within the translation path.

Example 2 can include, or can optionally be combined with the subject matter of Example 1, to optionally include wherein the limiter housing includes a limiter cavity, and the sash stop is received within the limiter cavity in the retained position.

Example 3 can include, or can optionally be combined with the subject matter of one or any combination of Examples 1 or 2 to optionally include a biasing element coupled between the sash stop and the limiter housing, the sash stop is biased toward the engaging position by the biasing element.

Example 4 can include, or can optionally be combined with the subject matter of one or any combination of Examples 1 through 3 to optionally include wherein the biasing element includes one or more of a compression spring, a torsion spring or an elastomer.

Example 5 can include, or can optionally be combined with the subject matter of one or any combination of Examples 1-4 optionally to include wherein the limiter housing includes a housing flange, and the sash stop includes a sash stop flange, and the sash stop flange engages with the housing flange while a sash is engaged with the sash stop, and the engagement of the sash stop flange and the housing flange prevents movement of the sash past the sash stop.

Example 6 can include, or can optionally be combined with the subject matter of Examples 1-5 to optionally include wherein one or more of the sash stop and the reset are rotatable relative to the limiter housing.

Example 7 can include, or can optionally be combined with the subject matter of Examples 1-6 to optionally include wherein the sash stop is rotatable at a stop pivot, and the reset is rotatable at a reset pivot, and the reset pivot is positioned between the stop pivot and a sash intercepting face.

Example 8 can include, or can optionally be combined with the subject matter of Examples 1-7 to optionally include wherein the sash stop includes at least one of a stop retaining pin or a retaining pin channel, and the reset includes at least the one of the retaining pin channel or the stop retaining pin.

Example 9 can include, or can optionally be combined with the subject matter of Examples 1-8 to optionally include wherein in transition from the engaging position to the retained position the stop retaining pin is aligned with the retaining pin channel according to movement of the sash stop, and the reset is movable into the resetting position after the stop retaining pin is aligned with the retaining pin channel.

Example 10 can include, or can optionally be combined with the subject matter of Examples 1-9 to optionally include wherein in the resetting configuration the sash retaining pin is received within the retaining pin channel, and reception of the sash retaining pin (and engagement of the sash retaining pin with the walls of the retaining pin channel) holds the sash stop in the retained position.

Example 11 can include, or can optionally be combined with the subject matter of Examples 1-10 to optionally include wherein in the sash limiting configuration the sash retaining pin is outside of the retaining pin channel and the sash stop is released to the engaging position.

Example 12 can include, or can optionally be combined with the subject matter of Examples 1-11 to optionally include a window assembly including the sash limiter assembly coupled thereon, the window assembly including: a window frame, and one or more sashes slidably positioned within the frame, and wherein at least one sash limiter assembly is coupled between the one or more sashes, and the at least one sash limiter assembly is configured to selectively limit opening of the one or more sashes to a predetermined opening.

Example 13 can include, or can optionally be combined with the subject matter of Examples 1-12 to optionally include wherein the one or more sashes includes a first sash and a second sash, and the at least one sash limiter assembly is coupled with the first sash, and the sash stop engages the second sash while the sash stop is in the engaging position and the second sash is opened.

Example 14 can include, or can optionally be combined with the subject matter of Examples 1-13 to optionally include wherein the at least one sash limiter assembly includes first and second sash limiter assemblies each positioned on opposed stiles of the first sash.

Example 15 can include, or can optionally be combined with the subject matter of Examples 1-14 to optionally include wherein the one or more sashes are one of vertically or horizontally slidable within the frame.

Example 16 can include, or can optionally be combined with the subject matter of Examples 1-15 to optionally include wherein the sash stop includes a sash stop ramp configured to slide relative to a sash while the sash travels over top of the sash stop in the retained position or while the sash travels toward a closed position.

Example 17 can include, or can optionally be combined with the subject matter of Examples 1-16 to optionally include a method for using a sash limiter assembly comprising: moving a sash stop from an engaging position within a translation path of a sash to a retained position out of alignment with the translation path; moving a reset to a resetting position after moving the sash stop to the retained position, moving the reset including: moving the reset within the translation path while in the resetting position, and holding the sash stop in the retained position with the reset while the reset is in the resetting position; moving the sash in a first direction (e.g., toward the fully open position) and engaging the reset in the resetting position, the reset moved from the resetting position by the engagement, movement of the reset from the resetting position releasing the sash stop; moving the sash in a second direction different from the first direction, moving the sash in the second direction moves the sash away from the

sash stop; and moving the sash stop into the engaging position after release of the sash stop by the reset and moving of the sash away from the sash stop.

Example 18 can include, or can optionally be combined with the subject matter of Examples 1-17 to optionally include wherein moving the sash stop includes depressing the sash stop relative to the reset.

Example 19 can include, or can optionally be combined with the subject matter of Examples 1-18 to optionally include wherein moving the sash stop includes rotating the sash stop relative to the reset.

Example 20 can include, or can optionally be combined with the subject matter of Examples 1-19 to optionally include wherein moving the reset includes rotating the reset relative to the sash stop.

Example 21 can include, or can optionally be combined with the subject matter of Examples 1-20 to optionally include wherein moving the sash stop includes aligning a stop retaining pin with a retaining pin channel, and moving the reset includes moving the reset according to the alignment of the stop retaining pin with the retaining pin channel.

Example 22 can include, or can optionally be combined with the subject matter of Examples 1-21 to optionally include wherein holding the sash stop in the retaining position includes holding the stop retaining pin in the retaining pin channel.

Example 23 can include, or can optionally be combined with the subject matter of Examples 1-22 to optionally include arresting movement of the sash in the first direction with the sash stop in the engaging position.

Example 24 can include, or can optionally be combined with the subject matter of Examples 1-23 to optionally include wherein arresting movement includes engaging a sash stop flange of the sash stop with a housing flange of a limiter housing.

Example 25 can include, or can optionally be combined with the subject matter of Examples 1-24 to optionally include wherein arresting movement includes engaging arcuate surfaces of a limiter housing and the sash stop at a sash stop pivot in surface to surface contact.

Example 26 can include, or can optionally be combined with the subject matter of Examples 1-25 to optionally include biasing the sash stop toward the engaging position.

Example 27 can include, or can optionally be combined with the subject matter of Examples 1-26 to optionally include wherein moving the sash stop includes rotating the sash stop around a sash stop pivot, and moving the reset includes rotating the reset around a reset pivot different from the sash stop pivot.

Each of these non-limiting examples can stand on its own, or can be combined in any permutation or combination with any one or more of the other examples.

The above detailed description includes references to the accompanying drawings, which form a part of the detailed description. The drawings show, by way of illustration, specific embodiments in which the invention can be practiced. These embodiments are also referred to herein as "examples." Such examples can include elements in addition to those shown or described. However, the present inventors also contemplate examples in which only those elements shown or described are provided. Moreover, the present inventors also contemplate examples using any combination or permutation of those elements shown or described (or one or more aspects thereof), either with respect to a particular example (or one or more aspects thereof), or with respect to other examples (or one or more aspects thereof) shown or described herein.

In the event of inconsistent usages between this document and any documents so incorporated by reference, the usage in this document controls.

In this document, the terms "a" or "an" are used, as is common in patent documents, to include one or more than one, independent of any other instances or usages of "at least one" or "one or more." In this document, the term "or" is used to refer to a nonexclusive or, such that "A or B" includes "A but not B," "B but not A," and "A and B," unless otherwise indicated. In this document, the terms "including" and "in which" are used as the plain-English equivalents of the respective terms "comprising" and "wherein." Also, in the following claims, the terms "including" and "comprising" are open-ended, that is, a system, device, article, composition, formulation, or process that includes elements in addition to those listed after such a term in a claim are still deemed to fall within the scope of that claim. Moreover, in the following claims, the terms "first," "second," and "third," etc. are used merely as labels, and are not intended to impose numerical requirements on their objects.

The above description is intended to be illustrative, and not restrictive. For example, the above-described examples (or one or more aspects thereof) may be used in combination with each other. Other embodiments can be used, such as by one of ordinary skill in the art upon reviewing the above description. The Abstract is provided to comply with 37 C.F.R. §1.72(b), to allow the reader to quickly ascertain the nature of the technical disclosure. It is submitted with the understanding that it will not be used to interpret or limit the scope or meaning of the claims. Also, in the above Detailed Description, various features may be grouped together to streamline the disclosure. This should not be interpreted as intending that an unclaimed disclosed feature is essential to any claim. Rather, inventive subject matter may lie in less than all features of a particular disclosed embodiment. Thus, the following claims are hereby incorporated into the Detailed Description as examples or embodiments, with each claim standing on its own as a separate embodiment, and it is contemplated that such embodiments can be combined with each other in various combinations or permutations. The scope of the invention should be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled.

What is claimed is:

1. A window assembly including a sash limiter assembly, the sash limiter assembly comprising:

a limiter housing configured for installation in one or more sashes or a window frame of a window;

a sash stop movably coupled with the limiter housing, the sash stop movable between engaging and retained positions, the sash stop includes at least one of a stop retaining pin or a retaining pin channel, the retaining pin channel having first and second ends;

a reset movably coupled with the limiter housing, the reset movable into a resetting position, the reset includes the other of the retaining pin channel or the stop retaining pin; and

wherein the sash limiter assembly is configured for positioning between a sash limiting configuration and a resetting configuration, and the stop retaining pin slides between the first and second ends of the retaining pin channel in positioning between the sash limiting and resetting configurations:

in the sash limiting configuration the sash stop is in the engaging position and configured for positioning in a translation path of the sash, and

in the resetting configuration the sash stop is held in the retained position by the reset held in the resetting position, and the reset is held in the resetting position by the stop retaining pin engaged along a portion of the retaining pin channel, in the retained position the sash stop is configured for positioning out of alignment with the translation path, and in the resetting position the reset is configured for positioning within the translation path.

2. The window assembly of claim **1**, wherein the limiter housing includes a limiter cavity, and the sash stop is received within the limiter cavity in the retained position.

3. The window assembly of claim **1** comprising a biasing element coupled between the sash stop and the limiter housing, the sash stop is biased toward the engaging position by the biasing element.

4. The window assembly of claim **3**, wherein the biasing element includes one or more of a compression spring or a torsion spring.

5. The window assembly of claim **1**, wherein the limiter housing includes a housing flange, and the sash stop includes a sash stop flange, and the sash stop flange engages with the housing flange while a sash is engaged with the sash stop, and the engagement of the sash stop flange and the housing flange prevents movement of the sash past the sash stop.

6. The window assembly of claim **1**, wherein one or more of the sash stop and the reset are rotatable relative to the limiter housing.

7. The window assembly of claim **6**, wherein the sash stop is rotatable at a sash stop pivot, and the reset is rotatable at a reset pivot, and the reset pivot is positioned between the sash stop pivot and a sash intercepting face.

8. The window assembly of claim **1**, wherein in transition from the engaging position to the retained position, the stop retaining pin is aligned with the retaining pin channel according to movement of the sash stop, and the reset is movable into the resetting position after the stop retaining pin is aligned with the retaining pin channel.

9. The window assembly of claim **1**, wherein in the resetting configuration the stop retaining pin is received within the retaining pin channel, and reception of the stop retaining pin holds the sash stop in the retained position.

10. The window assembly of claim **1**, wherein in the sash limiting configuration the stop retaining pin is outside of the retaining pin channel and the sash stop is released to the engaging position.

11. The window assembly of claim **1** further including:

the window frame,

and the one or more sashes slidably positioned within the frame, and

wherein at least one sash limiter assembly is coupled to the one or more sashes, and the at least one sash limiter assembly is configured to selectively limit opening of the one or more sashes to a predetermined opening.

12. The window assembly of claim **11**, wherein the one or more sashes includes a first sash and a second sash, and the at least one sash limiter assembly is coupled with the first sash, and the sash stop engages the second sash while the sash stop is in the engaging position and the second sash is opened.

13. The window assembly of claim **12**, wherein the at least one sash limiter assembly includes first and second sash limiter assemblies each positioned on opposed stiles of the first sash.

14. The window assembly of claim **11**, wherein the one or more sashes are one of vertically or horizontally slidable within the frame.

15. The window assembly of claim **1**, wherein the sash stop includes a sash stop ramp configured to slide relative to a sash while the sash travels over top of the sash stop in the retained position or while the sash travels toward a closed position.

16. A method for using the sash limiter assembly of claim **1** comprising:

moving the sash stop from the engaging position within the translation path of the sash to the retained position out of alignment with the translation path, moving the sash stop aligns the stop retaining pin with the retaining pin channel having first and second ends;

moving the reset to the resetting position after moving the sash stop to the retained position, moving the reset including:

moving the aligned stop retaining pin relative to the retaining pin channel between the first and second ends,

moving the reset within the translation path while in the resetting position, and

holding the sash stop in the retained position with the reset in the resetting position through engagement of the stop retaining pin along a portion of the retaining pin channel;

moving the sash in a first direction and engaging the reset in the resetting position, the reset moved from the resetting position by the engagement, movement of the reset from the resetting position releasing the sash stop;

moving the sash in a second direction different from the first direction, moving the sash in the second direction moves the sash away from the sash stop; and

moving the sash stop into the engaging position after release of the sash stop by the reset and moving of the sash away from the sash stop.

17. The method of claim **16**, wherein moving the sash stop includes depressing the sash stop relative to the reset.

18. The method of claim **16**, wherein moving the sash stop includes rotating the sash stop relative to the reset.

19. The method of claim **16**, wherein moving the reset includes rotating the reset relative to the sash stop.

20. The method of claim **16**, wherein holding the sash stop in the retaining position includes holding the stop retaining pin in the retaining pin channel.

21. The method of claim **16** comprising arresting movement of the sash in the first direction with the sash stop in the engaging position.

22. The method of claim **21**, wherein arresting movement includes engaging a sash stop flange of the sash stop with a housing flange of the limiter housing.

23. The method of claim **21**, wherein arresting movement includes engaging arcuate surfaces of the limiter housing and the sash stop at a sash stop pivot in surface to surface contact.

24. The method of claim **16** comprising biasing the sash stop toward the engaging position.

25. The method of claim **16**, wherein moving the sash stop includes rotating the sash stop around a sash stop pivot, and moving the reset includes rotating the reset around a reset pivot different from the sash stop pivot.

26. A window assembly including a sash limiter assembly, the sash limiter assembly comprising:

a limiter housing configured for installation in one or more sashes or a window frame of a window;

a sash stop movably coupled with the limiter housing, the sash stop movable between engaging and retained positions;

a reset movably coupled with the limiter housing, the reset movable into a resetting position;

wherein the sash stop includes at least one of a stop retaining pin or a retaining pin channel, and the reset includes the other of the retaining pin channel or the stop retaining pin, the retaining pin channel having first and second ends; and

wherein the sash limiter assembly is configured for positioning between a sash limiting configuration and a resetting configuration:

in the sash limiting configuration the sash stop is in the engaging position and configured for positioning in a translation path of the sash, and

in the resetting configuration the sash stop is held in the retained position by the reset in the resetting position, the reset retains the sash stop in the retained position through sliding reception of the stop retaining pin between the first and second ends of the retaining pin channel, in the retained position the sash stop is configured for positioning out of alignment with the translation path, and in the resetting position the reset is configured for positioning within the translation path.

27. The window assembly of claim **26**, wherein the sash stop is directly coupled with the limiter housing at a stop pivot, and the reset is directly coupled with the limiter housing at a reset pivot different from the stop pivot.

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